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WITNESS my hand this
Twenty-fifth day of August 2004

LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT
AND SALES

Our Ref: 78256503

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PROVISIONAL SPECIFICATION

Applicant(s): Rapid Intelligence Pty Ltd
3/109 Young Street
Cremorne New South Wales 2090
Australia

Address for Service: DAVIES COLLISON CAVE
Patent & Trade Mark Attorneys
Level 10, 10 Barrack Street
SYDNEY NSW 2000

Invention Title: **Content presentation**

The invention is described in the following statement:

CONTENT PRESENTATION

Background of the Invention

The present invention relates to a method and apparatus for controlling the presentation of content using a processing system, and in particular for a method of modifying the presented content to thereby increase its user appeal.

Description of the Prior Art

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

The theory of memes draws an analogy between the spread of genetic information from generation to generation in the natural world, with the spread of ideas from person to person. When humans repeat ideas they have heard, they do not pass them on exactly how they heard them, with the effect that ideas are replicated imperfectly. As a result desirable elements of ideas which are added will tend to propagate in subsequent generations through the mechanism of natural selection. Thus, in a manner similar to the mechanism whereby differences between individuals in any given population impacting on the individuals survival chances, so to attributes of ideas can effect the survivability and reproducibility of the ideas.

The Internet provides a physical medium for the transmission of ideas and has consequently allowed for the proliferation of messages sent from user to user, such as chain letters and jokes. Messages of this form are generally sent from person to person when the sender considers the associated content worthwhile or appealing. In some cases, the recipient will change the content of the message, which may lead to an increase in the appeal of the content. This in turn will result in the altered messages being passed on to others, and may even increase the likelihood of the message spreading when compared to the original "parent" message. Over time altered "descendant" messages can bear less and less resemblance to their ancestor.

In reality, most Internet users generally do not have a creative urge to actively change content. They are active only in selecting what content they view and subsequently pass on to others, thereby making there input to the dissemination of content substantially passive. As a result, with most users being passive, content is rarely modified and can be disseminated among millions of people without alteration. This is despite the fact that the people viewing the message may have differing tastes and backgrounds, meaning that the content is found unappealing to many individuals, such that they will tend not to pass the message on further.

A "Darwinian Poetry" website exists at http://www.codeasart.com/poetry/darwin.html which asks users to manually compare two computer-generated poems. Elements of poems which are often chosen survive while others die. However, in this system, the user views multiple competing content options to be displayed, and then selects those which are preferred. By contrast, the current content options are selected on the basis of competition between content options based on relative levels of traffic.

Summary of the Present Invention

In a first broad form the present invention provides a method of controlling the presentation of content to a user using a processing system, the method including causing the processing system to:

a) Receive a content indication representing content to be displayed;

b) Present the content in accordance with the content indication; and,

c) Selectively distributing the content indication to at least one of:

   i) Other processing systems; and,

   ii) Other users; and,

d) Selectively modify the content indication prior to at least one of:

   i) Presenting the content; and,

   ii) Distributing the content.

The content indication can be the content, the method including selectively modifying the content indication by modifying the content.

Alternatively, the content indication can be a content specification defining the content to be presented, the method including selectively modifying the content indication by modifying the content specification to thereby modify the content presented.

The content specification may include a number of parameters defining the content to be presented, the method including:

a) Modifying the content specification by modifying the parameters; and,

b) Presenting the content in accordance with the parameters.

The content specification may include a script, the method including causing the processing system to execute the script to thereby allow the content to be presented.

The content specification can exist in the form of a URL (Universal Resource Locator), the method including causing the processing system to present the content as a web page.

The content can be a content collection, the content collection including one or more content instances. In this case, the content instances can include at least one of:

a) Images;

b) Textual information;

c) Audio information;

d) Executable code;

e) Display code;

f) Data objects;

g) Links to other content; and,

h) Multimedia objects.

The method may include causing the processing system to present the content instances in accordance with a template, the template being determined in accordance with the content indication.

The processing system may be coupled to a store for storing a number of content instances, the method including:

a) Obtaining one or more content instances from the store; and,

b) Presenting the content including the obtained content instances.

Typically the method includes at least one of:

a) Selecting one or more of the number of content instances in accordance with the parameters; and,

b) Modifying one or more of the content instances in accordance with the parameters.

The content may be in the form of a web-page, the content indication being a URL, the method including causing the processing system to:

a) Modify the URL; and,

b) Using a re-direct process to present a web-page in accordance with modified URL.

The method of modifying the content indication may include:

a) Transferring the content indication to the processing system using a form; and

b) Causing the processing system to:

i) Receive the form;

ii) Modify the content indication; and,

iii) Distribute the modified content indication.

In this case, the form can be an HTML form, although other types of form could be used.

The method typically includes selectively modifying the content indication in accordance with predetermined mutation rules.

In this case, the mutation rules can define at least one of:

a) Whether the content indication is to be modified; and,

b) The nature of any modification to be performed.

The method may include causing the processing system to determine the mutation rules from at least one of:

a) A store coupled to the processing system; and,

b) The content indication.

The mutation rules may include modifying the parameters:

a) Randomly;

b) By selecting alternative parameters from a predetermined list;

c) In accordance with input commands received from a user; and,

d) in accordance with predetermined rules.

The method may include causing the processing system to:

a) Maintain a log, the log indicating previous presentations of the respective content; and,

b) Modify the content indication in accordance with the respective log.

The processing system can include a store, the method including causing the processing system to maintain the log in the store. Alternatively, or additionally, the method may include causing the processing system to maintain the log in the content specification.

The processing system may include a base station coupled to one or more end stations via a communications network, the method including:

a) Causing the end station to;

i) Receive the content indication from another end station; and,

ii) Transfer at least a portion of the content indication;

b) Causing the base station to:

i) Receive the content indication portion from the end station;

ii) Determine the content for presentation in accordance with the content indication portion;

iii) Transfer the selected content to the end station via the communications network; and,

c) Causing the end station to display the selected content.

The method can include causing the base station to modify the content indication portion.

The content indication may be a content specification, and the content indication portion being parameters included in the content specification.

The method typically includes causing the processing system to:

a) Receive new content from user;

b) Modify content indications to thereby cause the new content to be presented.

The method may include:

a) Causing the end station to:

i) Receive the new content from the user; and,

ii) Forward the new content to the base station; and,

b) Causing the base station to:

i) Receive the new content;

ii) Store the new content in a store; and,

iii) Modify one or more content indications to thereby cause the new content to be displayed.

The method can include causing the processing system to:

a) Receive input commands from a user; and,

b) Define a user defined content indication in accordance with input commands, the user defined content indication being adapted to cause content selected by the user to be presented.

The method may include causing the processing system to:

a) Provide an indication of available content;

b) Allow the user to select available content in accordance with the available content indication; and,

c) Generate a user defined content indication in accordance with the selected content, the user defined content indication being adapted to cause the selected content to be displayed.

The method can include causing the processing system to:

a) Monitor the distribution of user defined content indications; and,

b) Provide an indication of the distribution to one or more users.

The method may include causing the processing system to:

a) Compare the distribution of a number of user defined content indications or user-submitted content instances;

b) Assess the relative success of the user defined content indications in accordance with the results of the comparison; and,

c) Provide an indication of the relative success of the user's or content's performance to one or more users.

The method can include distributing the content in accordance with input commands received from the user.

The content typically includes web pages, the web pages having one or more links to other web pages. In this case, the method can include modifying the content by modifying the links.

The method can further include:

a) Monitoring the number of times each web page is viewed; and,

b) Modifying the links in accordance with the relative number of times each page is viewed.

In a second broad form the present invention provides apparatus for controlling the presentation of content to a user, the apparatus including a processing system adapted to:

a) Receive a content indication representing content to be displayed;

b) Present the content in accordance with the content indication; and,

c) Selectively distributing the content indication to at least one of:

i) Other processing systems; and,

ii) Other users; and,

d) Selectively modify the content indication prior to at least one of:

i) Presenting the content; and,

ii) Distributing the content.

The apparatus of the second broad form of the invention can be adapted to perform the method of the first broad form of the invention.

In a third broad form the present invention provides a computer program product for controlling the presentation of content to a user, the computer program product including computer executable code which when executed on a suitable processing system causes the processing system to perform the method of the first broad form of the invention.

Brief Description of the Drawings

An example of the present invention will now be described with reference to the accompanying drawings, in which: -

Figure 1 is a schematic diagram of an example of a processing system suitable for implementing the present invention;

Figure 2 is a flow chart of an example of the process implemented by the system of Figure 1;

Figure 3 is a schematic diagram of an example of a distributed system suitable for implementing the present invention;

Figure 4 is a schematic diagram of an example of one of the end stations of Figure 3;

Figure 5 is a flow chart of a first example of the process implemented by the system of Figure 3; and,

Figure 6 is a flow chart of a second example of the process implemented by the system of Figure 3.

Detailed Description of the Preferred Embodiments

An example of apparatus suitable for performing the present invention is shown in Figure 1.

In particular, Figure 1 shows a processing system 10 which is capable of modifying content presented to user, to thereby provide the user with alternative content. The aim of this is to attempt to improve the appeal or level of interest in the content, by increasing the likelihood of the content being distributed to other individuals. By making repeated adjustments to the content in accordance with predetermined rules, this aims to maximise the popularity of the content, by improving the ability of the information to propagate between users.

It will be appreciated that this may be achieved by any form of processing system. However, in one example the processing system includes a processor 20, a memory 21, an input/output (I/O) device 22, such as a monitor and keyboard or the like, and an external interface 23 coupled together via a bus 24. In use, the external interface 23 allows the processing system to be coupled to other processing systems, via a communications network or the like, as will be described in more detail below.

Accordingly, it will be appreciated that the processing system may be any form of processing system suitably programmed to perform the content presentation and/or modification, as will be described in more detail below. The processing system may therefore be a suitably programmed computer, lap-top, palm computer, PDA, server,

suitable programmed mobile phone, interactive television, or the like. Alternatively, specialised hardware or the like may be used.

In any event, the basic principles of the present invention will now be described in outline with reference to Figure 2.

In particular, at step 100 the processing system 10 receives a content indication from a user. The content indication represents some form of content to be displayed. Accordingly, it will be appreciated that a number of different forms of content indication may be used.

Thus, for example, the content indication may be the content itself. In this case, the content is distributed in some form which allows it to be displayed by the processing system. This may for example take the form of a file, e-mail, or the like, which contains the content, and which can simply be displayed to the user.

Alternatively, the content indication can be a content specification which represents a trigger that will cause the processing system to obtain and display the content. This could be in any one of a number of forms such as a URL (Universal Resource Locator), an e-mail, MMS message or the like, depending on the respective implementation. It will therefore be appreciated that the content specification may be input manually using the I/O device 22, or may alternatively be received via the external interface.

In any event, the process will then proceed either to step 110, or omit steps 110 to 130 and proceed directly to step 140 (as shown by dotted line), depending on the implementation. In practice, the system may use both options.

In particular, if steps 110 to 130 are performed, the processing system 10 determines if the content indication is to be mutated at step 110. In general, the content indication controls the content that is to be presented to the user, and accordingly, modification of the content that is presented can be achieved by appropriate modification of the content indication. In

this regard the term "mutation" therefore refers generally to any modification that will result in a change in the content being presented or the way it is presented (eg. using different technical means), which is usually achieved by modification of the content indication.

In any event, the assessment of whether mutation is to occur is performed as it may not be desirable to mutate the content indication each time the content indication is used to display content as will be described in more detail below. The assessment may be performed in a number of ways, such as by having the processing system 10 access predetermined mutation rules defining criteria for controlling the mutation of the content indication. Such mutation rules may therefore take any one of a number of forms depending on the respective implementation, and will be discussed in more detail below. However, generally mutation rules indicate one or more of:

- Whether mutation of the content indication is to occur;
- When any mutations are to occur; and,
- The nature of any mutations.

At step 120 the processing system 10 therefore determines if the content indication is to be mutated, and if so, proceeds to mutate the content indication at step 130. This may again be achieved using a variety of techniques. However, generally it is achieved in accordance with predetermined mutation rules which specify how the content indication is to be modified to allow different content to be presented. It will be appreciated that the manner in which this is achieved will depend on the respective implementation and will be described in more detail below.

Following this, or if the content indication is not mutated, at step 140 the processing system 10 displays the content in accordance with the content indication. Accordingly, when the content is displayed to the user at step 140, the content will either be in its original form if no mutation occurred at step 120, or if steps 110 and 120 were not performed, whilst it will be in a modified form if the processing system 10 has mutated the content indication at step 130.

In some implementations, a modification may happen every time the content is displayed. That is, there is no decision about whether to mutate, because it always does so. Alternatively, content may be modified only periodically.

In either case, the user can decide to transfer the content specification to another user at step 150. It will be appreciated that this will only occur in the event that the user has found the content to be of interest for some reason, and this therefore controls whether the content is distributed to other users. If the user does not pass the content on then the process will simply end at this point, although this fact may still be of interest to the log analysis component, which will be described in more detail below.

In the example above, the processing system 10 performs steps 110 to 130 to determine if the content indication is to be mutated. However, it may be preferable to mutate the content indication after the content is viewed by the user at step 110. Accordingly, instead of performing the steps 110 to 130, the processing system 10 can perform steps 160 to 180, in which the assessment of whether the content indication is to be mutated occurs after step 150, such that it is only if the content indication is to be distributed that it is mutated.

In this case, the processing system 10 will similarly assess whether a mutation is to occur at step 170, and then in response to a positive determination, perform a mutation at step 180.

In either case, the content indication may then be transferred to another user at step 190. This may be achieved in any one of a number of means depending on the implementation, such as by transferring the content specification to other processing systems via the external interface 23, or manually, by having the user communication directly with another user, as will be described in more detail below.

In any event, this allows this process to be repeated by other users. Thus, it will be appreciated that if the mutation makes the content more appealing or of interest, then there

is a higher chance of any one user transferring the content indication to other users.

As a result, positive mutations which make the information more appealing are more likely to be disseminated, whereas negative mutations which make the content less appealing will tend not to be passed on to the same degree, such that the relative appeal of the content to the user acts as a filter to control the propagation of the mutated content. Similarly, the original non-mutated content may also be transferred.

This leads to the situation in which different versions of the content specification will compete against each in order to be propagated between users, which in turn will continually result in the failure of unappealing content to be propagated. From this it will be seen that as the content propagates and is mutated over time, this will lead to an overall improvement in the appeal of the content for the audiences which pass it on, as will be described in more detail below.

In any event, it will be appreciated from the above that the mutation may occur at any time, such as at steps 110 to 130, before the content is viewed by the user, or at steps 160 to 180 before the content is transferred to another user. The only requirement is therefore that there is an opportunity for mutation to occur between the content being viewed by different users.

It will therefore be appreciated that a further possibility is for the mutation to occur after the content indication is transferred from the processing system 10 at step 190, but before it is received at another processing system at step 100, although this is not shown in Figure 2 for clarity purposes.

In any event, the content may be of any one of a number of forms depending on the implementation of the invention. Thus for example, the content can include text, graphical images, audio and multimedia data, such as video sequences or the like. Accordingly, the form of the content indication and the manner in which this causes the content to be displayed and is mutated will depend on the circumstances in which the invention is used.

Similarly the manner in which the processing system 10 assesses whether to mutate the content indication will vary depending on the implementation of the invention, and a number of examples will be discussed in more detail below with respect to Figure 3, which shows a distributed architecture suitable for propagating information between a number of users.

Figure 3 shows an example system formed from a base station 1 coupled to a number of end stations 3 via communications network 2, such as the Internet, and one or more other communications networks 4, such as local area networks (LANs), or the like.

In this example, the base station 1 may be adapted to present content, or control the presentation content, to users of the end stations 3. In order to achieve the base station 1 includes a processing system 10, similar to the processing system 10 described above with respect to Figure 1, and which is coupled to a data store 11 such as a database 12. Additional remote data stores 11A in the form of databases 12A may also be provided coupled to the Internet 2 or the communications or the LANs 4.

The base station 1 is generally adapted to store content for presentation to the users and may also be adapted to mutate the content indication. In one example, the content indication is a content specification provided in the form of a URL with the content being presented in the form or a web page. In a second example the content indication is in the form of an e-mail with the content being presented embodied within the e-mail.

Accordingly, the base station 1 may be adapted to generate web pages and display these to users of the end stations 3 in accordance with a received content specification such as a URL, or to operate to transfer e-mail between users by acting as an e-mail exchange server, or to simply provide content in response to a request. In any event, the base station 1 and end stations 3 must generally be adapted to communicate to allow the content to be presented as required. It will be appreciated by persons skilled in the art that the base station 1 is not required, for example if the content is distributed through a peer-to-peer

network, and is included in this example for the purpose of illustration only.

An example of a typical end station 3 is shown in Figure 4. As shown the end station 3 includes a processor 30 coupled to a memory 31, an I/O device 32, such as a monitor an e-port or the like, and an external interface 33, coupled together via a bus 34. In use the external interface 33 is adapted to allow the end station to connect to a suitable one of the communications networks 2, 4 and may therefore be an Ethernet LAN card, modem, or the like.

It will be appreciated from this that the processing system 10 provided in the base station 1 is typically in the form of a server, such as a web e-mail server, with the end station 3 being a suitably programmed computer, lap-top, palm computer, PDA, mobile phone, or the like. Alternatively, however specialised hardware or the like may be used.

An example of operation of the system to present content to the user will now be described with reference to Figure 5. In particular, in this example the content indication is a content specification in the form of a URL, with the content being presented as a web page.

Accordingly, a user of one of the end stations 3 receives a URL at step 200. This may be achieved in any one of a number of manners, such as by receiving the URL embedded in an e-mail, or via instant messaging, or even via alternative systems, such as direct communication between users using for example telephones, letters, or the like.

The user requests the URL from the base station 1 using the end station 3 at step 210, which is usually achieved by providing the URL in the address window on a web browser as will be appreciated by a person skilled in the art. In any event, the URL is determined by the processing system 10 at step 220.

In normal circumstances, a web server would then use the URL not only to locate the sites where content is served from, but also to specify any individual code to be executed and the input parameters required for that executable code. Thus, the URL may include

parameters, identifiers, scripts, or the like, that are used by a web server to control the web page that is displayed. In addition to this, redirects can be used to automatically transfer users to pages with different URL's which may contain different content in order to achieve mutation that will be sent on in the modified form to others.

In this example however, the processing system 10 operates to determine predetermined mutations rules at step 230, which define if any mutation is to be performed. The mutation rules are generally stored in the database 12, although this is not essential. In any event, the mutation rules are used to control the modification of the URL depending on certain criteria, as will be described in more detail below. Thus for example, the mutation rules may specify that the URL is to be mutated randomly in which case on certain occasions the processing system 10 will determine if the URL is to be mutated.

In this example, the URL is implemented in the form of a script having a number of parameters. The parameters are executed by the base station 1 to cause the base station to present predetermined content. The manner in which this is achieved will depend on the exact nature of the content. However, it is not essential for the content specification to be a URL, and other forms of the specification may be used.

In any event, when parameters are provided in the content specification these can be used to modify the content displayed in a number of ways including:

(a) The parameters form a list of identifiers, which cause the delivery of particular items of content (or content instances). For example, the querystring "title=12&pic=23&pic=240&pic=1" could lead to the display of a title with text matching ID 12 pictures with identifiers 23, 240 and 1, in that order. In this case the database 12 would include a record of the ID's allowing these to be matched to the content.

(b) The parameters effect the appearance of, or the way content is delivered. For example "color=FFEEFF&refresh=10&content_type=gif&nose=large&mouth=small" could lead to the display of a computer-drawn man with a large nose and small mouth in

GIF format on an off-white background, refreshing every 10 seconds.

(c) The parameters represent a special identifier which points to a more complex collection of data or parameters, stored in the database 12. It might take the form of a collection of identifiers and parameters as in (a) and (b), or the actual content itself (such as natural language text or a picture). The identifier may be generated specifically for the purpose of displaying the particular page. Descendent "Children" of the page (i.e. subsequent mutations) may be assigned a new identifier. The benefit of this is that it allows more genetic complexity than can be stored as parameters in a URL.

Alternatively, parameters may not be required, for example if an arbitrary set of content is simply shown to the user. In this case, the content may be contained within the medium (eg text within an email message, text within the URL which is then displayed on the web page), rather than retrieved from any database, as will be described in more detail below.

In any event, for the purposes of this example, it will be assumed that the content is in the form of a number of content instances each in form of graphical images, multimedia objects, or the like. In this instance the web page will be in the form of a template with the URL including a script and/or parameters representing the respective content instances which are to be displayed.

Typically the base station will therefore maintain a database 12 of a significant number of content instances with respective ones of the content instances being selected in accordance with the parameters. Thus, for example, the base station 1 may store a database of 500 potentially amusing images. The URL will then specify ten parameters corresponding to respective content instance or image identifiers, which therefore cause ten different respective images to be imported into the template and displayed.

It will be appreciated that the template is not required as every single bit of HTML code could map to an identifier, or there could be preset content including a number of images therein.

At step 240 the processing system 10 determines if the URL parameters are to be mutated, and if this is determined to be the case at step 250, the process proceeds to step 260 with the processing system 10 modifying the parameters.

The manner in which the mutation can be performed will vary depending on the implementation of the invention. In this example, in which content specification includes the parameters outlined in points (a) to (c) above may be mutated in accordance with any combination of one or more of the following respective techniques:

(a) A different set of identifiers are specified. They may be inserted ("title=12&pic=23&pic=240&pic=3&pic=1"), replaced ("title=12&pic=23&pic=499&pic=1"), or deleted ("title=12&pic=240&pic=1") or a combination thereof.

(b) The parameters are altered. The extent of numerical parameters may be changed (e.g. "color=EEDDEE&refresh=10&content_type=gif&nose=large&mouth=small" would make the background slightly darker) or an option may be changed "color=FFEEFF&refresh=10&content_type=jpeg&nose=large&mouth=small" would now display the man in JPEG format.

(c) The content is changed in some way, (e.g. words are inserted, an animated explosion is made to look more fiery) and a new identifier is created which maps to this new information, with the parameters being updated to reflect the new identifier.

Alternatively if parameters were not used, the content itself could be read and edited. The server may read the actual information which the sender wishes to pass on and the system will alter slightly. (One practical implementation of this would be where a user reads an email, then activates an HTML form to pass the information on to a friend. The form sends back the text presented to the user (i.e. in HTML syntax the BODY of the message is repeated in HIDDEN input fields). The server then makes textual changes.

In any event, in this example, the processing system 10 mutates the parameters, by

modifying one or more of the parameters, such that the modified parameters correspond to ten images, at least one of which is different to those specified by the original unmodified URL. The processing system 1 then redirects the user to the revised URL at step 270.

The processing system 10 then generates a web page using the mutated URL parameters to access any template and content instances from the database 12 at step 280. The generated web page can then be displayed to the user at step 290.

It will be appreciated that if the URL was not mutated, then the web page will include the original ten images thereon. However, if the web-page has been mutated then the web page presented on the end station 3 will have a different set of ten images, such different content is provided to the user.

Following this the user will optionally transfer the URL of the display page to another end station 3 at step 300. This then allows other users to follow the same procedure.

Thus, in this example, the base station 1 periodically mutates the URL so that one or more of the images presented to a user will be changed. It will be appreciated that if the resulting combination of images is, for example, a particularly amusing combination of images then this will result in the respective URL being transferred to a vast number of people thereby causing wide propagation of the respective URL. This in turn causes wide propagation of the particular combination of pictures.

Thus, if the mutation results in a more favourable page being displayed then this is more likely to be passed on to one or more subsequent users. In fact it is typical for popular pages to be passed on from one user to many other users thereby causing a rapid propagation of the respective content. By contrast, less popular content will tend to be propagated fewer times and indeed may even not be propagated at all such that if a particular mutation generated by the base station 1 results in undesirable information content being displayed then this will then not be passed on to other users.

In this example, the mutation is described as being before the content is displayed to the user requesting the URL. However, as outlined above, a number of variations on this technique are possible.

For example, the mutation could be performed after the user has viewed the content, but before the URL is passed on to another user. Thus, in this case, when a user receives a URL and requests that this is displayed, the URL will always cause content to be displayed in accordance with the received URL. However, once the content is displayed and the user decides to forward the URL, the URL could be mutated, such that the next user will view different content.

This will be achieved in a number of ways depending on the implementation. Thus, for example, the URL may be forwarded using an HTML form at the bottom of the content containing web page is presented to the user. In this example, the user can then enter contact details, such as e-mail addresses of potential recipients of the URL in appropriate fields in the form. Once the form has been completed the base station 1 will use the e-mail addresses to distribute the URL to the other users, with the base station 1 making an assessment as to whether the URL should be mutated at this time. This would typically be achieved in a manner similar to that described above with respect to steps 240 to 260, with the base station 1 being adapted to forward the mutated URL if mutation is performed in accordance with the mutation rules.

This allows the mutation to be performed only in the event that the content indication is being distributed to other users (ie after an assessment has been made that the content presented is desirable in some way), as well as ensuring that the mutation is performed, and that the URL is not passed between users in a non-mutated form.

Alternatively, a URL to a document may exist within another web page, and this URL may mutate over time, favouring content specifications that have yielded the most pageviews in the web server logs.

In the above example, content in the form of content instances, associated templates and mutation rules are stored in the database 12, and applied by the base station 1. However this is not essential.

For example, the mutation rules, parameters and/or the content may be embedded in the content specification, which is in the form of a data object. An example of this will now be described with reference to Figure 6, in which the content specification is implemented as an e-mail, which includes a number of parameters included therein.

In this case, a user receives an e-mail at the end station 3 at step 400. At step 410 the end station 3 extracts the parameters from the e-mail together with one or more mutation rules at step 420. The end station 3 will then determine if the parameters are to be modified in accordance with the mutation rules at step 430. Thus for example, the mutation rules may indicate that the e-mail is to be modified if it has a certain number of previous source addresses in the e-mail transfer chain Alternatively, the mutation may be timed, performed in accordance with a probability, or the like, as will be discussed in more detail below.

If it is determined at step 440 that the parameters are to be mutated the end station mutates the parameters at step 450. Following this, or otherwise, the end station 3 transfers the parameters to the base station 1 at step 460.

The base station 1 then supplies content based on the parameters. Thus, this may be achieved in a manner similar to that described above by selecting respective content instances from a number of content instances stored in the database 12 in accordance with the parameters. Other techniques may also be used.

In any event, at step 480 the end station 3 embeds the content in the e-mail when it is opened so that this may then be viewed by the user. Thus, when the user opens the e-mail, they will be presented with respective content based on the respective parameters. If the parameters are mutated the e-mail content will therefore differ to that seen by the sender of the e-mail, whereas if the parameters are not mutated the content of the e-mail will be

identical.

In any event, at step 490 the user optionally forwards the e-mail to another end station 3 in the usual way.

Thus, it will be appreciated that in this example by embedding the mutation rules in the content specification, which in this case is in the form of an e-mail, this allows the end station 3 receiving the content specification to determine the mutation itself.

In this example the parameters are then used to download content from the base station 1. However, it will be appreciated that the content may be downloaded for example from the database 12A or may alternatively be forwarded within the content specification.

Thus for example the e-mail may include twenty picture attachments with five of these being selected for display in the respective e-mail, in accordance with the parameters. This can be achieved by embedding the attachments within the e-mail so that these are not viewed by the user such that the user is only aware of the five respective content instances being displayed. In this particular instance, the e-mail will therefore periodically appear to change that is if it is forwarded between a number of different users.

Furthermore, by embedding all the required properties and content within the e-mail itself, this removes the requirement for the base station 1.

Content

As described above, the system requires some form of source content with an associated content modifying mechanism. Examples of the techniques for providing mutable content include:

- Selecting content
  - This content may be in the form of a set of content fragments, such as content instances, drawn from a database or file system, which match identifiers provided in the content indication, such as the URL. (e.g.. pictures, HTML fragments)

- Generating content
  - This may be achieved using a piece of executable code which uses input parameters from a content indication to generate a particular piece of content;
- Modifying content
  - A piece of content may be transferred as the content indication, with the content itself being modified in accordance with predetermined rules.
- Blending content
  - Content fragments may be integrated as per the content specification.

In order to achieve this, the system can utilise a number of different types of content indications. In particular, the only requirement is that the content indication must provide for some way in which variable content can be presented, with the content indication being modifiable in predefined manners.

Examples of content indications include:

(a) Content specifications such as Universal Resource Locators (URLs) which include parameters for controlling the loading of pages of content. The parameters can be altered causing the user to be redirected to a new URL with the changed parameters, allowing a different page to be presented, as described in more detail above.

(b) Content indications in the form of the content itself which is displayed as part of a data object, such as an email with the content embedded therein. The recipient is presented with the option of passing on the message to others. This causes a request by the server, where the server may mutate the content, then send out the new content instances (e.g. emails) containing the content in the modified form. An example of this would be where an HTML form resides in an email, which contains input boxes for friends' email addresses. Submission of the form invokes the server to mutate the content and email it to the recipient's nominated friends.

(c) Content indications such as executable code is embedded within a data object (e.g. email) to facilitate the mutation of the referral URL contained in the message. This

may be achieved with or without contacting a server to assist in the decision of what and how to mutate.

Furthermore, the content displayed can include a number of different formats. Thus, for example, content can include content instances such as:

- Images;
- Textual information;
- Audio information;
- Executable code;
- Display code;
- Data objects;
- Links to other content; and,
- Multimedia objects.

In this regard, data objects include any data or executable commands such as Enterprise Java Beans, Perl objects, XML documents, etc, which when executed in conjunction with other data or code will result in the display of some information or other content, as will be appreciated by persons skilled in the art.

Thus, it will be appreciated that different content indications and different types of content may be used in any one of a number of combinations.

Content Categories

The system may utilise a number of individual categories of content for use with different content indications. Thus for example, two categories such as a list of Christmas jokes and a list of Knock Knock jokes, may be provided such that when these mutate, Christmas jokes never appear in the Knock Knock joke pages and vice versa. Thus the different categories are mutually exclusive, and in a biological analogy, might be regarded as "species".

Content Collections

Collections of content may be provided and utilised to allow users to access a range of different content. Thus, for example, the content collection may interact with the user allowing the user to select to view different subsets, content categories, or other combinations of content, or the like.

An example of this is when the presented content is in the form of a number of related web pages. In this case, the content indication in the form of a URL content specification is used to display a first web page which includes an index to allow the user to link to subsequent pages so that these may be viewed. Thus, the initial web page presented to the user would include a number of different URL links, such as hyperlinks, thereon, which cause the user to be directed to other web pages.

It will be appreciated that the content specification can act to define those links that may be presented. Thus, the links can be viewed as respective content instances, which can then be selected in accordance with a content specification. In this case, the respective index presented to the user will vary depending on the mutations to the content specification.

For example, the links may be used to allow different categories of content to be accessed. In this case, the content specification may cause links to a number of categories of jokes, such as "Knock Knock" jokes or Christmas jokes. In this case, following mutation of the content specification links to different categories of jokes could be displayed.

Alternatively or additionally, the content specification may control the content presented once the links are selected. Thus, the content specification may control the parameters used to select the content presented on the linked web page. Thus, if the link is a URL, then the parameters from the content specification can be imported into the URL link, causing different content to be displayed.

Thus, for example, the index page may be a list of joke categories ("Christmas jokes, knock knock jokes, marriage jokes, etc"), with the content specification identifying

particular to jokes within each category. Thus, the content specification may effectively define not only which categories are to be provided on the index page, but also which content instances or jokes with each category are to be displayed.

For example, the content specification may indicate:

- Category - Christmas Jokes
  - Content Instances - "Christmas_joke_id=52&Christmas_joke_id=525& Christmas joke id=12& Christmas_joke_id=41"
- Category – Knock Knock Jokes
  - Content Instances "knock_knock_joke_id=42&knock_knock_joke_id=424& knock knock joke_id=142".

Thus, the actual content instances referred to are not displayed on the index page, but are displayed when the link to the appropriate content category has been selected. Thus, the index page would indicate that either Knock Knock jokes or Christmas jokes can be selected via an appropriate link. Assuming the Knock Knock jokes link is selected, jokes having the identifiers 42, 424 and 142 are displayed to the user on an appropriate web page.

Thus, when the index page is created, the jokes indicated in the content specification of the index page are included as parameters in the links on the index page, as follows:

- " Christmas jokes"; and,
- "Knock knock jokes"

These joke listing pages can be passed on and mutate separately. But the content indication to the index and related pages may be successful at propagation, both because users like to arrive at "sites", not merely individual pages, and further, from an evolutionary perspective, the index page would select content on the subsequent pages which support

their own propagation at the expense of the subsequent pages.

Alternatively the subsequent pages may not be allowed to mutate, or there could be some other, more complex relationship between the two based on statistical analysis of how they support each other.

An alternative approach is to link to pages which have been performing well. This entails that the index page does not mutate when passed on from person to person, but may change the pages it links to by other methods. One embodiment of this would be a list of current top-performing genetic pages.

Mutation Rules

A number of different mutation rules can be used.

Examples of these include:

(a) entirely random

(b) random but weighted towards particular identifiers and parameters which have been known to be successful in the past. This may be known through the application of some log analysis method.

(c) random but weighted towards behaviour as specified in the parameters (e.g. "hair=red&eyebrows=red&same_tendency=high" might specify that the hair and eyebrows of a displayed portrait are red and, when mutating, make it probable that hair and eyebrows will be the same colour.

(d) using some combinatorial scheme (akin to sexual reproduction). (for example "color=FFEEFF&refresh=10&content_type=gif&nose=large&mouth=small" might be requested and mixed with a randomly chosen recent referral e.g. "color=FF00FF&refresh=5&content_type=gif&nose=large&mouth=large" and a child is created "color=FF00FF&refresh=10&content_type=gif&nose=large&mouth=small" inheriting characteristics from both parents.

(e) some other mechanism

The nature of the mutation is implemented will also depend on the nature of the content indication. For example, as mentioned above, if the content indication includes parameters, then mutation is achieved by simply mutating the parameters. Thus, in this case, these rules can for example involve changing the parameters on a random basis such that a random number generator or the like is used to select a number and this is then used to control the alteration of parameters. Alternatively predetermined changes to parameters could be made, such as incrementing or decrementing the parameters in accordance with set rules.

However, if the content indication is the content itself, then there are may not be any parameters to alter, in which case the content itself must be modified.

For example, the content indication can be an e-mail including the content to be presented. In this case, the content indication is the content itself, and this can be modified by making predetermined modifications to the content in accordance with predetermined rules. Thus, for example, if the content is text, the content could be modified by changing words in the text in accordance with predetermined dictionary rules. Thus, when mutation is to occur, the processing system 10 will parse the text content and determine words satisfying predetermined criteria, and then alter these for example using language rules. Alternatively, the e-mail may contain a number of images, with different images being selected in accordance with a predetermined algorithm embedded within the code of the e-mail.

It will be appreciated that it is preferable to control the mutation to gain a trade off between alteration of the content presented and maintaining some form of consistency. In particular if each user views substantially different content, then the forwarding of the content specification will not represent the appeal of the respective content being displayed as the content displayed to the receiving user will inevitably be different.

This can be achieved by adjusting either or both of the mutation rate and the mutation

degree.

Thus for example the mutation rate can be adjusted so that the content is only mutated occasionally and this may occur for example by having a mutation probability defined which indicates a one-in-ten chance of the content being mutated. Alternatively, or additionally systems can be configured to monitor how frequently respective specifications have been received and control the mutation accordingly. For example, the base station 1 may be adapted to only mutate the content indication after it has been used a predetermined number of times. In order to achieve this, the base station 1 can maintain a log in the database 12, indicating occurrences of respective content specifications being received and subsequently displayed and/or mutated.

More sophisticated implementations would allow the inputs into the decision as to whether and how to mutate to also be subject to mutation, just as they do in the biological world.

Alternatively, the log may form part of the content indication itself. In this case, the log may only reflect the history of distribution and mutation of the respective content indication instance. Thus, when a content indication is transferred to multiple users, a separate log will be provided for each content indication. Whilst these will initially be identical reflecting the fact that both content indication instances have the same history initially, they will become different as each content indication instance is distributed and mutated. In this case, the mutation rules can cause mutation to occur based on the usage of the content indication from the last mutation or the like.

If the log is maintained by a central base station 1, either in the content indications or the database 12, then the log may be updated to reflect total relative distribution and usage of all different mutation versions of the content indication. This allows the mutation rules to base the mutations on additional factors, such as the relative rate of mutation, and/or success of other content indication versions.

Thus, this allows the distribution and modification of content indications to be monitored

on a case by case basis.

In any event, using a log to monitor content presentation can ensure that content specifications are not modified to frequently. Alternatively, the operation of the system can be monitored and the mutation rules themselves modified or mutated to allow the operation of the system to be adjusted, thereby allowing an optimum level of mutation to be applied.

Additionally the content specification may include a large number of parameters. The mutation rules can be defined such that only a selected proportion of these may be mutated at any one time to thereby ensure that the mutation degree is also limited. Thus for example if the content specification results in the displaying of ten images it is preferable to ensure that only one or two of these images are altered on any one occasion thereby maintaining consistency between the content displayed between each of the users.

A log providing information regarding the presentation of content in accordance with the different content indications may also be used to assess the success of variations. Thus, in some cases, the URLs or content may be published on web-sites or other media. This may be updated over time according to what variations are successful. (For example, a web page places a link to a particular set of Christmas jokes. Over time, log analysis shows that a different set of Christmas jokes (within the same content group or "species") is enjoying more page-views among users who are passing them round. The new, more successful link thus automatically replaces the old one).

User Defined Content

It is possible to allow manual mutation of content indications, thereby allowing users to define respective content indications which can be used to present user selected content.

Thus, if the content specification is in the form of a URL with the parameters forming part of a script, the users can be provided with a page that enables them to adjust the parameters to cause different content to be displayed. This will allow users to experiment to find a

particularly appealing form of content which can then be forwarded on to other users as described above.

This can be expanded upon by providing the base station with a content generation system which will allow users to access a web page showing all available content instances. The users can then create their preferred combination in a form of manual mutation to help speed up the process of finding the most appealing combination of content. Once a desired combination of content is defined, this can be used to generate an appropriate content indication which can be distributed in the normal way. Alternatively, where parameters take the form of numerical or categorical values, the user may select these using a form.

Also, a user may make modifications to the actual content instance (eg. changes to text). These may be stored in a way where the alternative fragment becomes a mutation option for other views of the content "species". In the mutation process, these may be mixed with other user modifications. For example, we have a sentence "A priest walks into a bar" and one user suggests it be changed to "A nun walks into a bar" and another suggests "A priest walks into a pub". The system is then free to try "A nun walks into a pub."

In any case, monitoring a log of distribution and modification of the content indications will allow the base station 1 and operators thereof to determine the content indications which have been propagated the most and which are therefore the most favourable in targeting further content presentation.

This can allow the system to be used to compare the success of different content indications. Thus, in the case, in which content indications are defined by users, then the base station can compare the distribution of the content indications are thereby assess their success at being propagated. This can then be used by the base station 1 to determine the relative success of different user defined content indications allowing users to be provided with an indication of the success of the respective content indications. This in turn will allow contests to be run to find the most successful user defined content indication.

Users may also be permitted to submit content instances and the nature of the system means that low quality submissions will automatically be seen less. Again, logs can be used to monitor the presentation of user submitted content. Thus, users may be given incentives to submit content by being given a score indicating how successful their contributions have been. In this case, the success of the content could be measured by monitoring how many times it is presented, although this may be weighted by the quality of the users who view the page, as per some criteria. This would also allow contests to be run as to which individual could select the most content.

In this case, once it is determined by analysis of the log that respective content instances are less popular, their likelihood of appearing in a mutation may also be reduced by modifying an associated weighting as outlined above.

General

Accordingly, it will be appreciated that the system described above enables the altering of content in accordance with passive feedback provided by the forwarding or no of content specifications. This is allows the popularity of content to be judged without requiring the user to participate in active feedback by having the user enter ratings representing the appeal of the content, or the like. This is beneficial because most users will not participate in active feedback as there is no inherent benefit to them.

By analogy with the biological world, the content indications are organisms that may be dispersed across an environment in the form of the Internet. Reproduction occurs when the content indications are published or passed on to others, with mutations providing for variations in traits of the organisms, when the user is provided with different content. Natural selection depends upon users deciding whether to pass on the page to others, and this coupled with the mutation allows the system to automatically evolve towards an optimum content configuration.

The system requires very little server load, over and above an ordinary database-driven website as it does not necessitate any kind of active monitoring of system usage. Mutation

and content presentation can be controlled through basic scripting, although such measures may improve performance as discussed above. The system can naturally find ways of appealing to users in ways not foreseen by the content creators and is adaptive to time and audience without the need for any overall conscious creative decision or direction. The system provides a mechanism whereby potentially anyone can contribute content without the need for editors to determine whether it would be compelling to users, as this will inevitably be determined by the natural selection. Where users submit content themselves, the system provides a collaborative medium with less need for a dominant elite controlling direction and privileges.

It will be appreciated by a person skilled in the art that there are a significant number of benefits inherent in this mode of operation. In particular, different people will tend to find different combinations of content instances more appealing than others. Thus for example the users in the age range 18-25 may find a different combination of content instances appealing to those in older age ranges such as 40-50. Similarly, people with different tastes will also tend to find different content instances appealing. However this variation in tastes is automatically catered for in the operation of the system.

In particular, people will tend to forward appealing content to individuals with similar tastes. Thus for example if a user A finds a particular web page appealing they will forward the URL to users B and C who would also find the content appealing. In contrast, they may not forward the content to a user E who would find the content in poor taste. However, an alternative content instance combination will be forwarded to the user E as they might find this appealing. Similarly user E will then forward on content to individuals having a similar taste and so on.

As a result of this, not only does natural selection occur, but this will also take into account the surrounding environment, or user tastes. This can result in a number of different species of content instance, each of which tends to approach an optimum for a particular set of environmental conditions or user tastes. Thus, a first content specification may prove the most popular in the 18-25 age range, whilst a different content specification may

prove more popular in the 40-50 age range.

In any event, as the system ensures maximum propagation of those particular combinations which are appealing to the users, this in turn results in parallel mutations of content specification becoming popular amongst appropriate groups of individuals.

It will also be appreciated that the techniques described may operate within a range of different architectures. Thus, for example, the techniques can be implemented using the architecture described above, or may be implemented as part of a distributed system where other servers perform differing roles.

In this latter case, the base station 1 may receive content indications from other servers, and return content to those servers, so they can display them to the user. As part of this, the base station 1 would include directions on how to mutate the content indications. For example, a news site may be seeking to change its logo and wishes to experiment with different combinations, such as whether to make it smaller or darker. The news site takes in three parameters - the article identifier, the logo size and the logo brightness, with the logo size and brightness parameters being passed to the base station 1. The base station 1 then renders the logo based on these parameters, including optional mutation. Thus the base station 1 may decide to mutate the content indication, making the logo slightly smaller. These new parameters are passed on to the user by a redirect or some other mechanism already discussed. The article is retrieved from the news site's database as usual, and the elements are brought together and displayed to the user, such that in this case the user will view the smaller logo.

Thus, in this instance, this allows the base station 1 to maintain control over the mutation, even though the content indication is received by a different server which operates to cause the content to be displayed. Thus, in this case, the content indication will instruct the server to obtain the content from an external processing system such as the base station 1, as described.

It will be understood by those skilled in the art that the techniques could therefore function as web services and other distributed systems such as Microsoft's .NET framework. It may applied to more complicated areas such as business logic and data analysis.

Persons skilled in the art will appreciate that numerous variations and modifications will become apparent. All such variations and modifications which become apparent to persons skilled in the art, should be considered to fall within the spirit and scope that the invention broadly appearing before described.

Dated this Second Day of September, 2003

RAPID INTELLIGENCE PTY LTD
By their Patent Attorneys
DAVIES COLLISON CAVE

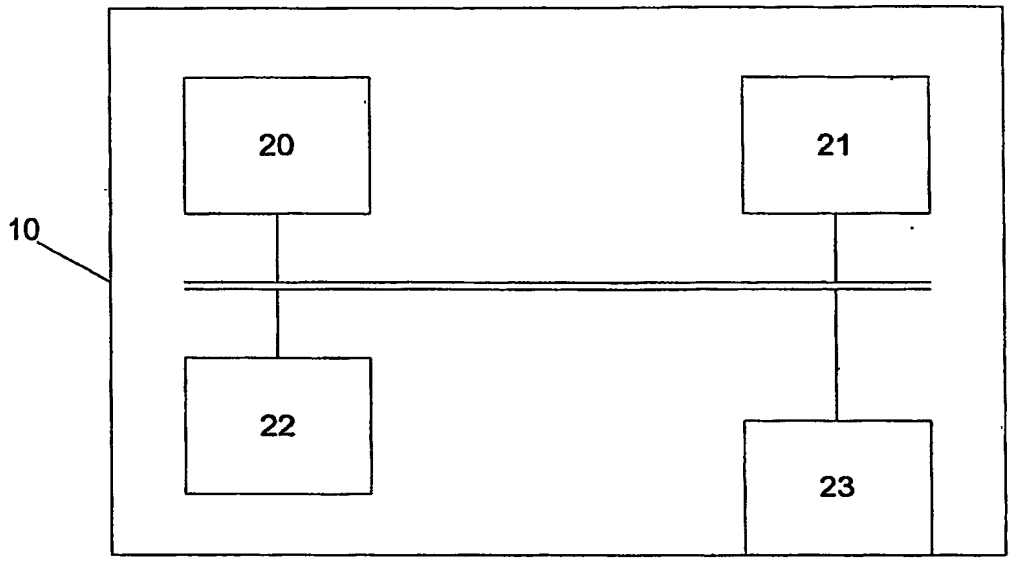

Fig. 1

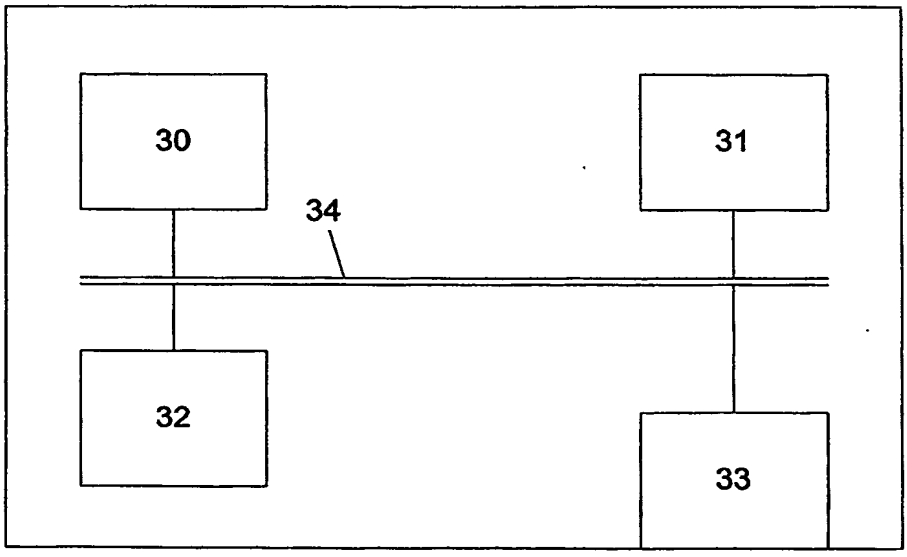

Fig. 4

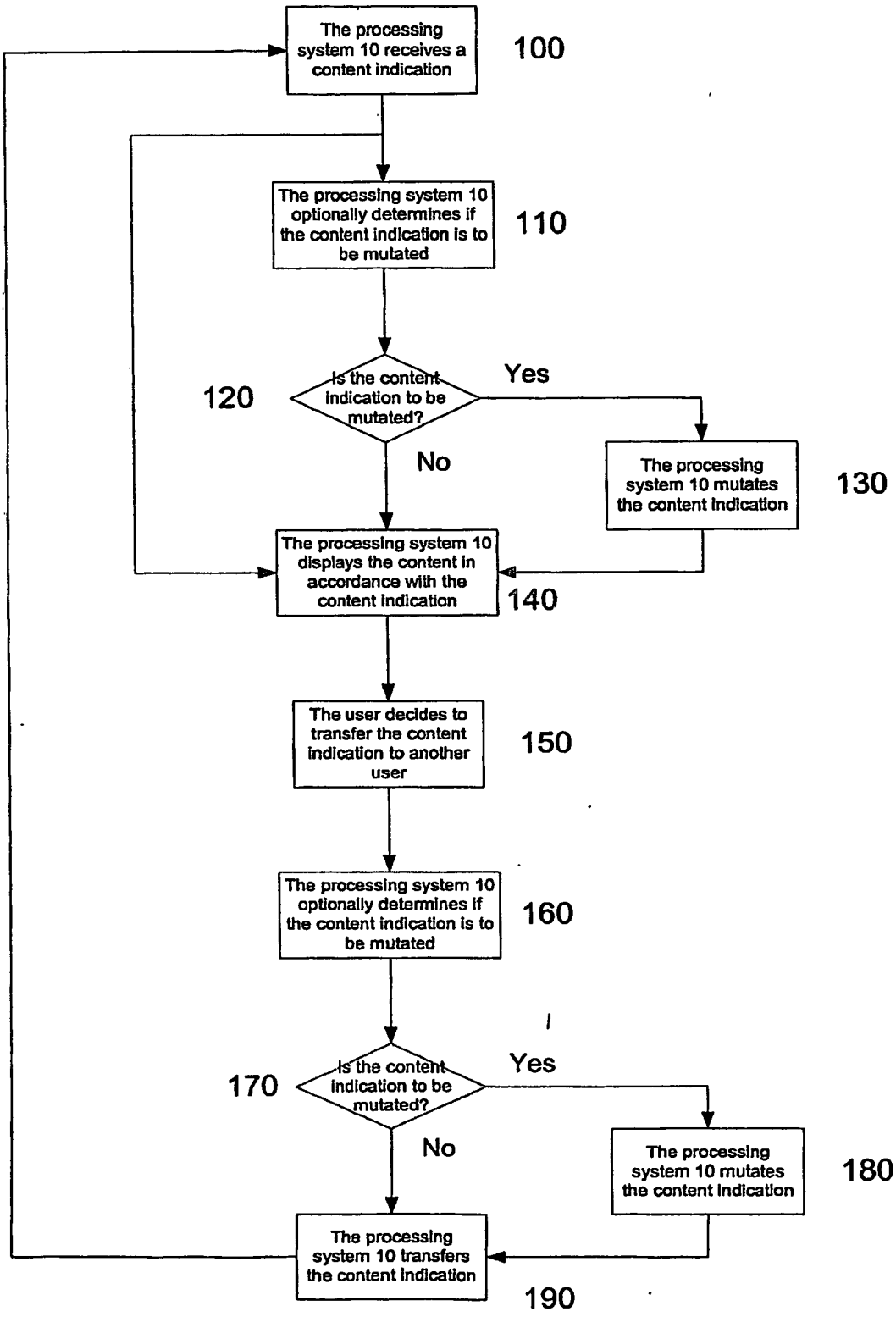
The processing system 10 receives a content indication
100
The processing system 10 optionally determines if the content indication is to be mutated
110
120
Is the content indication to be mutated?
Yes
No
The processing system 10 mutates the content indication
130
The processing system 10 displays the content in accordance with the content indication
140
The user decides to transfer the content indication to another user
150
The processing system 10 optionally determines if the content indication is to be mutated
160
170
Is the content indication to be mutated?
Yes
No
The processing system 10 mutates the content indication
180
The processing system 10 transfers the content indication
190

Fig. 2

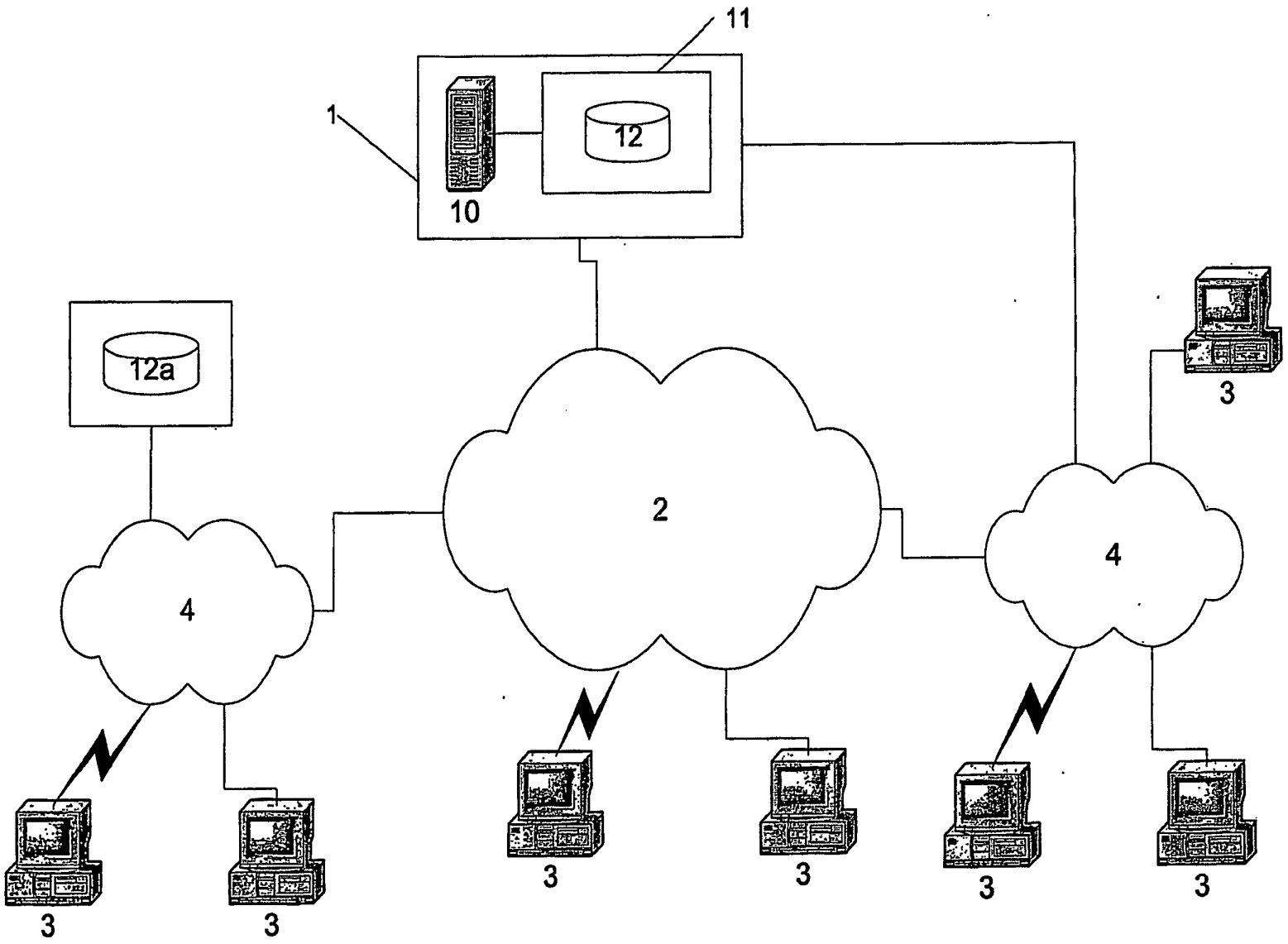

Fig. 3

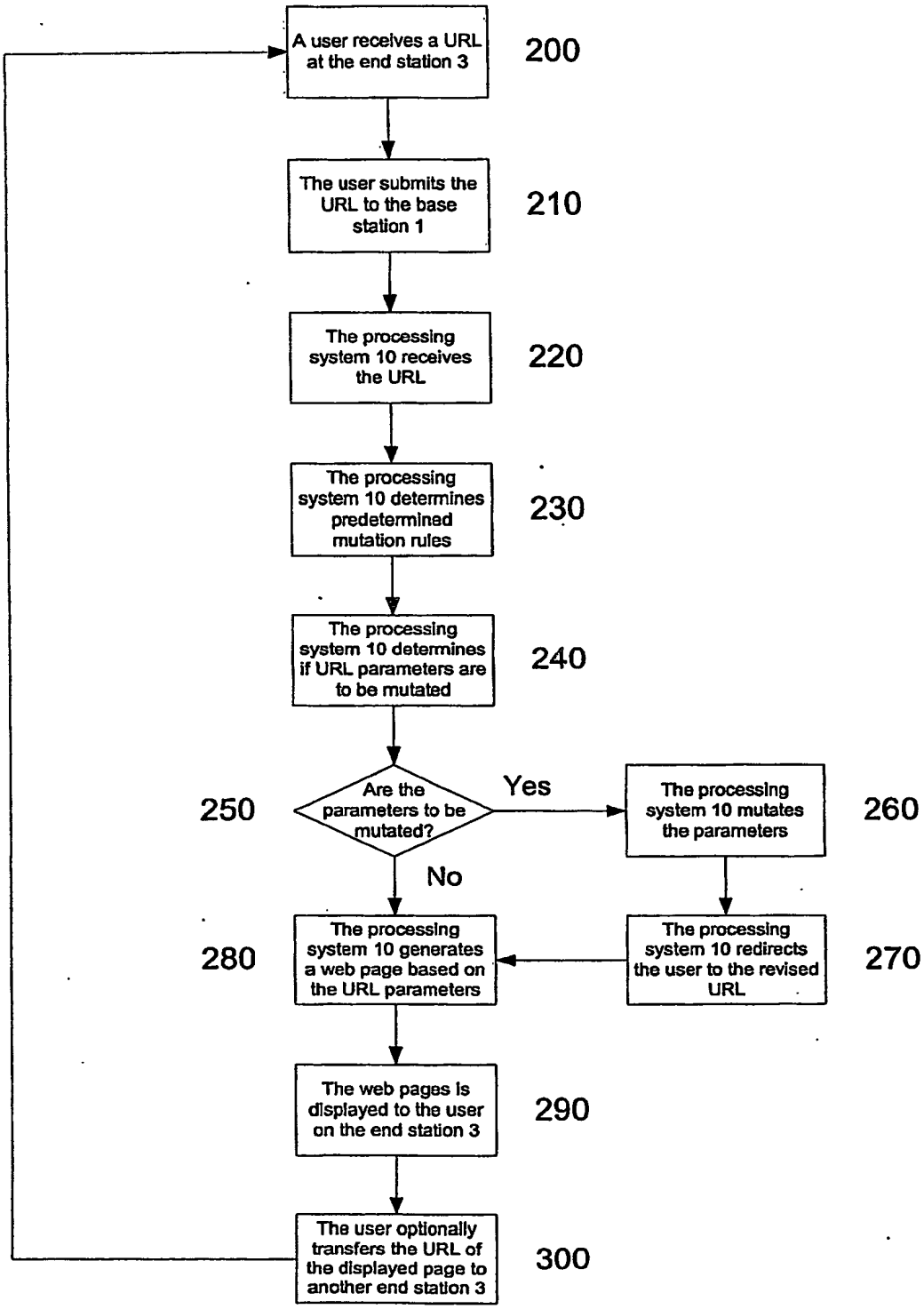
A user receives a URL at the end station 3
200
The user submits the URL to the base station 1
210
The processing system 10 receives the URL
220
The processing system 10 determines predetermined mutation rules
230
The processing system 10 determines if URL parameters are to be mutated
240
250
Are the parameters to be mutated?
Yes
The processing system 10 mutates the parameters
260
No
280
The processing system 10 generates a web page based on the URL parameters
The processing system 10 redirects the user to the revised URL
270
The web pages is displayed to the user on the end station 3
290
The user optionally transfers the URL of the displayed page to another end station 3
300

Fig. 5

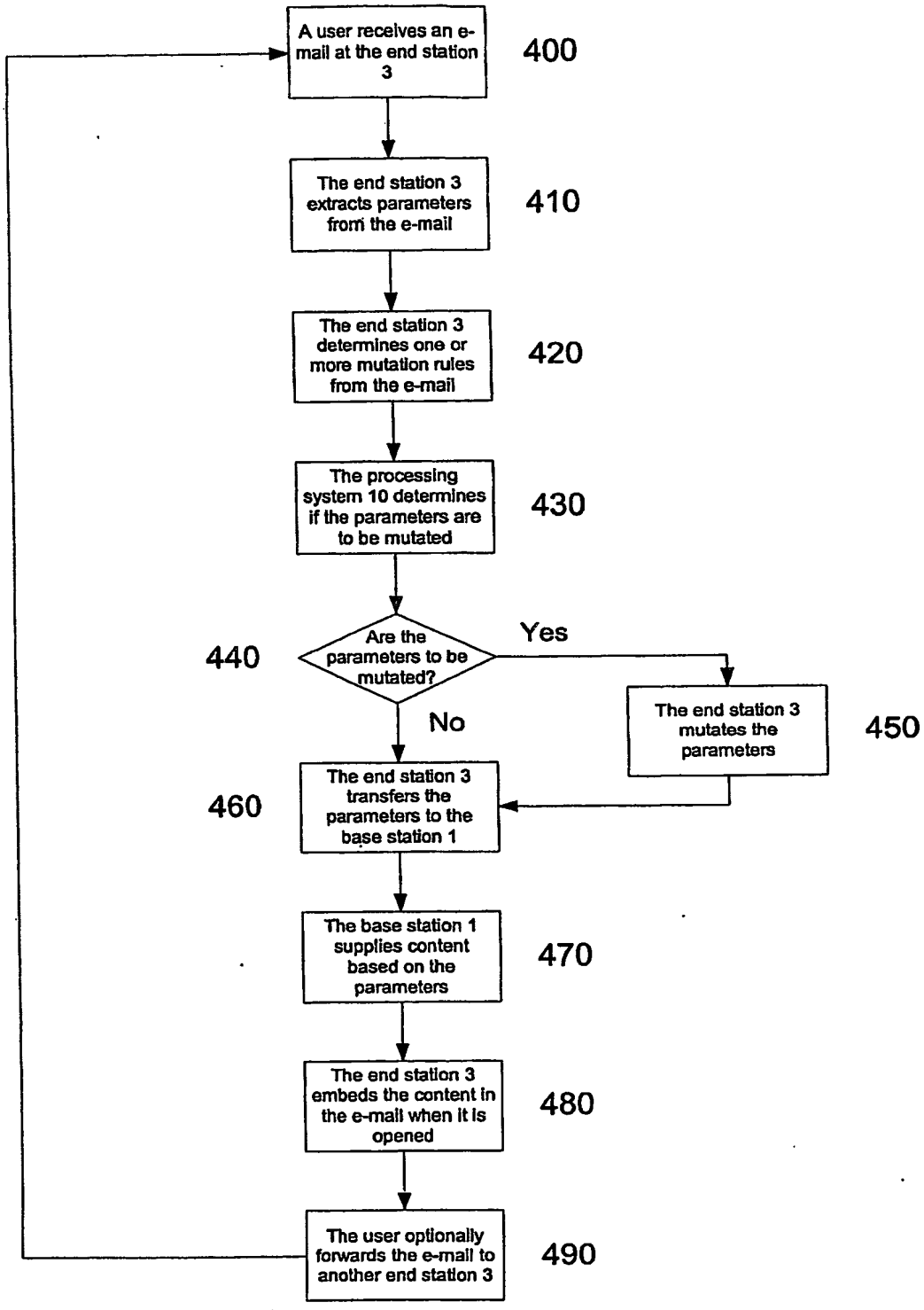
A user receives an e-mail at the end station 3
400
The end station 3 extracts parameters from the e-mail
410
The end station 3 determines one or more mutation rules from the e-mail
420
The processing system 10 determines if the parameters are to be mutated
430
Are the parameters to be mutated?
440
Yes
No
The end station 3 mutates the parameters
450
The end station 3 transfers the parameters to the base station 1
460
The base station 1 supplies content based on the parameters
470
The end station 3 embeds the content in the e-mail when it is opened
480
The user optionally forwards the e-mail to another end station 3
490

Fig. 6

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